**Objectives**

Upon completion of this activity, you will be able to:

* Identify movement and/or change of matter as it moves through the water cycle.
* Define residence time and predict how a system is impacted by changes in residence time.

**Causal Principles**

1. Gravitational energy, thermal energy and/or chemical **energy** drive all movement and change of matter on Earth.
2. A system is in **equilibrium** when energy in the system is balanced.
3. Matter moves and changes to return a system to **equilibrium**.
4. **Energy** is needed to break bonds and is released when bonds form.
5. **Temperature** is a measure of the movement of molecules. Higher temperature means molecules are moving faster.

**PART 1: Class Notes**

**Part 2: Group Work**

On the diagram below label the components of the water cycle:

Evaporation, Cloud, Precipitation, Runoff, Condensation, Surface water, Ground water.



Next label the phases or phase changes that occur at each component of the water.

Finally, label the causal principles by their numbers where they would be appropriate in the diagram.

**Part 3: Homework – Residence Time**

Residence time is the average amount of time that a material remains in a reservoir. Residence time is calculated by the following equation:

R.T. = amount in a reservoir ÷ flow in (or out) of the reservoir.

**Questions**

1. How might the amount of water in the atmosphere change if there was more surface water available for evaporation?
2. Based on your answer to question 1, if all of the glacial ice on Earth were to melt, what would happen to the amount of water in the atmosphere?